

Role of head CT in diagnosis of headache in Saudi population

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ABSTRACT

One of the most common global public health issues that results in a large demand for medical services is headache disorders. It is one of the most prevalent complaints in clinical practice globally and as a result, it has a significant social cost. The goal of the study was to determine whether or not patients needed neurological imaging for a correct diagnosis and to provide guidelines for the use of computed tomography in the diagnostic process. The investigation conducted from February 2022 to September 2022 at the Radiology Department of King Khalid Hospital in Al-Kharj, Saudi Arabia. Across sectional study that used the CT scan documentation found in the patient files of patients who were referred to the radiology department with headaches of any kind. There were 197 patients in the data. There were 90 females and 107 males. The causes of headaches varied among Saudi citizens; tension headaches were the most common variety, accounting for 25.3% % of all headache patients, followed by cluster headaches (23.8%) and migraines, which had the lowest proportionality. The majority of patients had normal CT scan results. The public health agenda must include headache diseases. The predominance of primary headaches is tension, migraine and cluster headaches. There is statistically no significance or need for a CT scan if there are no anticipated or existing injuries or conditions that could endanger life.

Keywords: Headache, CT, Migraine, Tension Type, Cluster, Saudi.

1. INTRODUCTION

Nearly 50% of adults experience headaches at least once each year, making them one of the major nervous system illnesses in the world (Almalki et al., 2021). Any pain in the neck or head is referred to as a headache or cephalgia, as a symptom. There are numerous types, however they can be broadly categorized into two groups: Headaches, both primary and secondary (Ahmed et al., 2012). It calls for creating a strong demand on medical services. Planning interventions and arranging services requires a strong understanding of their prevalence and distribution across the community

(Gururaj et al., 2014). One of the most common complaints in clinical practice around the world is this one and as a result, it has a significant social cost. The majority of main headaches are migraines, tension headaches and cluster headaches, which place a heavy burden on the sufferer, their families and society at large (Mengistu and Alemayehu, 2013).

According to Lifting the Burden, epidemiological research studies have demonstrated a rise in the occurrence of headaches, including migraines, tension type headaches and headaches brought on by medication overuse, as well as its link to a poor quality of life (Saylor and Steiner, 2018). Certain environmental or genetic elements increase one's risk of developing frequent headaches. Age, gender, hereditary conditions, pharmaceutical abuse, psychiatric comorbidities (anxiety, sleeplessness and depression), obesity, TMJ abnormalities, higher vulnerability to persistent headaches and life events are some of these factors (Xie et al., 2020).

After carefully reviewing your medical history, have a general and neurological evaluation to determine the majority of headache types. Chronic dehydration has been linked to headaches, according to a number of studies. Heavy or insufficient sleep can cause headaches that are severe and persistent, but this can be avoided by getting between 7 and 9 hours of sleep each night. While decreasing the consumption of foods high in histamine (such as cheese and other fermented foods) is beneficial for those who are prone to chronic headaches (Yuan and Silberstein, 2017). Up to 78% of people report having tension headaches as their major headache type. This type of headache typically lasts thirty minutes' to seven days is bilateral in distribution and is characterized by mild to moderate pain intensity. Numerous studies on the occurrence of migraines and other topics have come out of Middle Eastern nations; however adequate quantification of these results has not yet been achieved. There has been no research done too far in Saudi Arabia's general population on the frequency of headaches and its contributing causes (Ahmadi et al., 2020). This study seeks to provide recommendations for using computed tomography in the diagnostic process. It indicates whether or not patients need neurological imaging for an accurate diagnosis. Our work primarily focuses on CT imaging because these are the techniques that are most frequently utilized in headache clinical practice.

2. METHODOLOGY

The present study was being carried out in King Khalid Hospital, Al-Kharj and Kingdom of Saudi Arabia in the time period from the fifteenth of February 2022 to September 2022. The ethical issues were approved from ethical committee (PSAU-2022 ANT 98 /44PI). The documented CT results from patients who were sent to the radiology department with any sort of headache will be used in a cross-sectional study. A cross sectional study that used the CT scan documentation found in the patient files of patients who were referred to the radiology department with headaches of any kind enrolling all age groups, gender and final established diagnosis if any. For data management and analysis, instances that show brain abnormalities that point to an underlying cause of headaches will be classified as positive cases and reported alongside negative cases. The informed consent is not applicable.

Each patient's age, gender and the following details regarding their headaches were recorded. They also answered questions about any recent injuries or concussions they may have experienced and their blood pressure was obtained. The data was collected by a check list from patient records. GE HiSpeed-NX/I Base-2002 Dual Slice Helical CT was used for all of the brain CT scans in accordance with the established departmental policy. When not contraindicated, all patients underwent contrast medium augmentation utilizing a bolus of 40 ml of nonionic contrast medium, iopamidol, which contains 300 mg of iodine per milliliter. The data were analyzed by using SPSS version (25) and the (P value < 0.05) was considered as statistically significance.

3. RESULTS

There were 197 patients in the data. There were 90(45.6%) females and 107 (54.3%) males. To assess the prevalence of the kind, frequency, severity, side and character of pain of the patients' most common types of headaches, the patients were divided into five different age groups (Figure 1, Table 1). The causes of headaches varied among Saudi citizens; tension headaches were the most common variety, accounting for 25.3% of all headache patients, followed by cluster headaches (23.8%) and migraines, which had the lowest proportionality (10.6%). 40% of the individuals reported having other different types of headaches. The results have shown that the majority of the patients were suffering from tension type of headache; which might be related to the stress of the Saudi's live, mostly among the fifth decade a result agrees with study conducted over the European people which has shown that the majority suffer from tension type of headache followed by cluster type and migraine.

The data revealed that there is no statistically significant relationship between gender and headache frequency, that males experience headache frequency at a higher rate and that the number of patients is inversely correlated with headache frequency (Table 2). The data revealed the distribution of the primary headache categories across male and female patients, revealing that tension type headaches were more common in males than females while females had greater percentages of cluster headaches. The statistics indicated an increase in the percentage of patients in the second and third decades, with the cluster type reporting the

greatest percentage of any type. Our study revealed that the majority of CT reports for patients with headaches returned negative and there was no clinical correlation between the kind of headache and CT reports (Table 3, Figure 2, 3 and 4).

Table 1 Patient characteristics by demographic

Parameter		Number	Percentage
Gender	Male	107	54.3
	Female	90	45.6
Age (years)	Less than 19	19	9.6
	19-29	57	28.9
	30-39	49	24.8
	40-49	32	16.2
	50-60	29	14.7
	More than 60	11	5.5
Headache Frequency	Fewer than six times per week	28	14.2
	4 or fewer times per day	29	14.7
	4 to 6 times per day	13	6.5
	Inconstant	79	40.0
	Persistent	48	24.3
Type of headache	Tension headache	50	25.3
	Migraine	21	10.6
	Cluster type	47	23.8
	Other types	79	40.1
Intensity	Mild	118	59.8
	Moderate	50	25.3
	Sever	29	14.7
Report of CT	Normal	182	92.3
	Abnormal	15	7.6

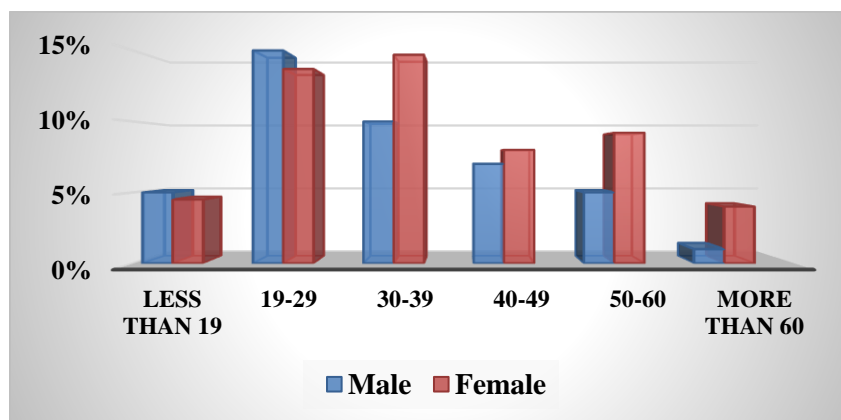


Figure 1 Male and female patients are distributed according to percentages and age groups

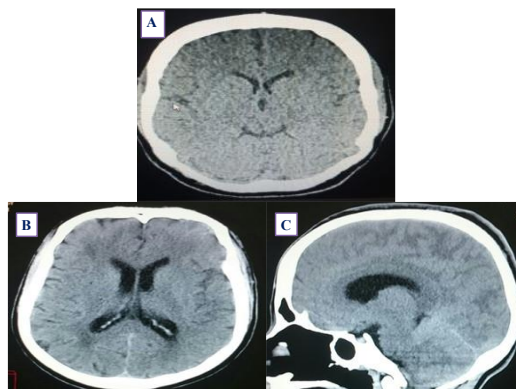
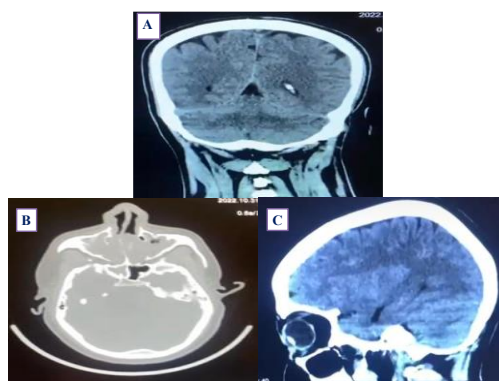
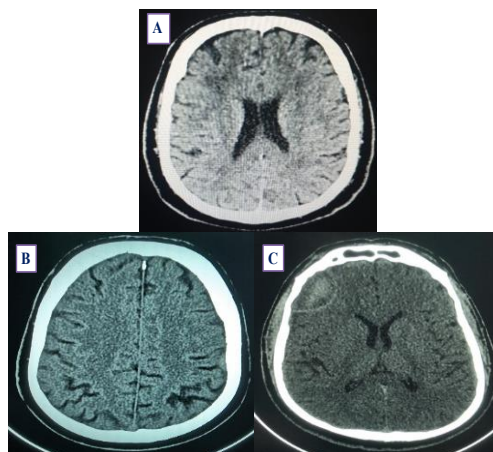
Table 2 Relationship between participant's gender and headache type

Variable		Gender of patients		Total	Chi square	
		Male (n=107) N (%)	Female (n=90) N (%)		Value	P value
Type of headache	Tension	29 (14.7%)	21 (10.6 %)	50 25.3%)	5.049	0.118
	Migraine	12 (6 %)	9 (4.5%)	21 (10.6%)		

	Cluster	21 (10.6 %)	26 (13.1%)	47(23.8%)		
	Others	45 (22.8%)	34 (17.2%)	79 (40.1%)		

Table 3 headache's types and CT report test of association

	Value	Asymptotic Standardized Error	Approximate T	Approximate Significance
Pearson's R	-.043	.079	.533	.533
Spearman Correlation	-.021	.079	.761	.761
No of Cases	197			

**Figure 2** Normal CT of different patients A) Normal axial brain CT scan. B & C) Normal axial and sagittal Brain CT scan**Figure 3** Normal CT of different patients A) Normal coronal brain CT scan. B) Axial CT scan with right nasal septum deviation maxillary and sphenoiditis, C) Normal sagittal Brain CT scan**Figure 4** Abnormal CT of different patients A) Axial Brain CT scan; Frontal white matter ischemic changes B) Axial Brain CT scan; Left parietal small Meningioma. C) Axial Brain CT scans; Right frontal (EDH) Epidural hematoma

4. DISCUSSION

This primary headache study comes after numerous earlier studies on headache occurrence. To determine the prevalence of the primary categories of headaches experienced by patients, a population based cross sectional survey was conducted on a randomly chosen sample of respondents. It was developed by doctors during interviews at numerous hospitals in Saudi Arabia's Al Kharij city. In addition, the findings were evaluated for significance when utilizing head CT on headache patients by comparing them to the CT report.

Numerous studies showed a significant prevalence of headaches and migraines, as well as unmet healthcare needs of those who suffer from headaches (Lebedeva et al., 2016). In line with the literature, our results showed that most of the patients with the condition were female, with the exception of tension headaches, which were more common in women (Herekar et al., 2017). These findings, which were corroborated by a previous study, demonstrated that males are more dominant than females in most conditions, excluding migraine headaches (El-Sherbiny et al., 2015). The findings, however, contradict a 2015 study by El-Sherbiny et al. That claimed that females were more affected overall, with the exception of the cluster type. They analyzed their findings using female lifestyle factors and came to the conclusion that marriage and high levels of education may raise the incidence of chronic headache (Hanashiro et al., 2015). While keeping in mind that Saudi women have very distinct life styles and behaviors, which may help to explain our findings. However, a study conducted in Iraq revealed that patients with diabetes experience higher headaches than people without diabetes (Al-Hamadani et al., 2018). Compared to obese people, those who were overweight had a higher prevalence of headaches. In a similar manner, a Chinese study discovered that patients with a greater BMI had a higher prevalence of chronic migraine and a tension type headache (Huang et al., 2019).

The majority of individuals with moderate to severe headaches had mild to moderately severe headaches and the pain was typically bilateral. These results somewhat correlate with what a study has observed, although his data showed a significant number of people experiencing severe pain, which may be related to the onset and length of the headache (Hanashiro et al., 2015). These different levels of severity may have been related to the type of employment or to certain habits, such as using mobile devices and computers for extended periods of time, which have been shown to increase headache intensity (Pucci et al., 2003). Our findings also showed headache among young people, supporting a study by Suzuki et al., (2005) that found stress among school students could worsen headaches to the point where it was greater than the discomfort from giving blood. Some of these findings were connected to and explained by drug abuse.

The results were statistically analyzed using Spearman Correlation to determine whether there is any value in using CT scans for patients who present with symptoms like headaches. The findings indicate that using CT for patients with headaches without suspecting any clinically relevant or life-threatening diseases has no association with the presence of the headache and is therefore not clinically meaningful.

5. CONCLUSION

The public health agenda must include headache diseases. The majority of primary headaches are of the tension, migraine and cluster variety. They have an impact on families and societies and place a heavy strain on society as a whole. Individuals are increasingly skipping work and school obligations. Patients who complain of headache symptoms should be evaluated by the emergency department staff to determine the type of headache they are experiencing. If the headache is a secondary headache, the patient should receive extra care and attention as well as additional diagnostic testing because they may have an underlying life-threatening condition. If no expected or present injuries or conditions that could endanger life, there is statistically no significance or need for a CT scan.

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Authors' Contributions

All authors contributed to the research and/or preparation of the manuscript. Ali Hassan A Ali, Omar O Serhan, Faisal Turki J Alqahtani and Faisal Abdulaziz O Alghamdi participated in the study design and wrote the first draft of the manuscript. Ali Ababtain, Saeed Moraya Alqahtani and Abdulelah Muaythir ALmuaythir collected and processed the samples. Maan Omar Alzuhairi, Khalid Hassan Alarjani, Salman Bader Alhusaini, Ameer S Alsaad and Nawaf Majed Alqahtani participated in the study design and performed the statistical analyses. All of the authors read and approved the final manuscript.

Ethics Approval

All series of steps that were implemented in this study that included animal models were in compliance with Ethics Committee of Prince Sattam bin Abdulaziz University Institutional Review Board (PSAU-2022 ANT 98 /44PI).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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